OS-64

The 64 Column Operating System

For the Timex/Sinclair 2068
Personal Color Computer

Publication Credits

Original manual by

      ZEBRA SYSTEMS, INC.
      78-06 Jamaica Avenue
      Woodhaven, NY 11421
      718.296.2385
      ©1985

Electronic Version:

   Ælfstangard Ælfstangardsonu ©2013

   QA 76.9.S65Z42 1985

Contents

OS-64

The 64 Column Operating System Cartridge

Overview

The OS-64 cartridge is a normal Timex/Sinclair 2068 operating system modified to provide a complete 64 column environment. OS-64 provides the following.

1) 64 columns on screen, this includes…

    a) LISTings

    b) PRINTing

    c) Editing

2) 64 columns to your Centronics printer, this includes…

    a) LPRINT

    b) LLIST

    c) COPY - Epson compatible only)

Complete Centronics printer support is built in and it is virtually user transparent. With OS-64 what you see on the screen (in 64 columns) is what you get on your Centronics printer.

OS-64 generates 64 characters per line on screen by using the T/S 2068's special 64 column video mode.

Limitations Of The 64 Column Mode

The 64 column video mode is a powerful hardware option because it doubles the amount of textual information that you can display on your screen, enabling you to program more professional applications. As is usual with small computers, advanced features require trade-offs with other features. This is very true with the TS2068's advanced video modes. Below I will discuss the limitations of the TS2068's 64 column mode.

The 64 column mode requires the user the use of a monochrome or RGB monitor. The visual quality of text on Color TVs or color monitors will probably be unacceptable.

The 64 column video mode does not provide FLASH. As a result the BASIC keyword FLASH will not do anything. Also, the editing line cursor will not FLASH.

There is no separately selectable BORDER color; the BORDER is automatically set to the current PAPER color.

There is no local (temporary) PAPER or INK. In OS-64, all PAPER and INK commands have global effect, that is, they change the entire screen. When you set PAPER, the INK automatically gets set to a complimentary color and vice versa.

Using The Cartridge

There's not much to it. Just turn the power to your computer off, plug the OS-64 cartridge in, and power up the computer. Voila! A 64 column enhanced operating system is at your fingertips. Just about everything works the same as the normal system, except you have the 64 column format.

One of the things you will have to learn about is the built-in Centronics printer support.

Centronics Printer Support

Overview

OS-64 does not support the Timex/Sinclair 2040 printer. LPRINT/LLIST/COPY output goes to your Centronics printer if you have a Centronics interface attached to your computer. Built in to the system is code to support the following Centronics interfaces…

                    1) Aerco

                    2) Tasman-B

                    3) Tasman-C

                    4) A & J

                    5) Oliger

A single POK will select your interface. If you desire, you can provide your own interface driver in RAM and select it for system use. This allows you to drive devices with any protocol (This includes RS232, as well as Centronics).

Selecting An Interface

To select one of the five interfaces listed above, POKE address 65523 with the following values:

                    1) Aerco   167

                    2) Tasman-B   135

                    3) Tasman-C   122

                    4) A & J   185

                    5) Oliger   167

To select your own interface driver positiona at address 'N' in RAM you have to alter the new system variable IFDR_addr to point to your routine. Use the following commands to do this…

< POKE 65523, N - INT (N/256) >

< POKE 65524, INT (N/256) >

If after selecting your own interface drive you want to reselect a system driver use the appropriate POKE from the descriptions plus the following…

< POKE 65524, 63 >

Sending Control Codes & Graphics Data

There are two types of data that can be sent to your Centronics printer; Character or Control codes. Each is handled differently within the system. If you want to send control codes or graphics date to your printer you must first signal the system by altering the new system variable PRDAT_typ (printer data type).

To select control code output…

< POKE 65518,1 >

To re-select character output…

< POKE 65518,0 >

In practice you should only select control code output for the brief period necessary to actually pass the control codes and then immediately re-select character output. Below is an example of this method. In this example we are sending the control codes for Emphasized Print mode to a Star Micronic SG10

Example

```
10 POKE 65518,1 : REM PRDAT_typ=cntrl code
20 LPRINT CHR$ 27;CHR$ 69; : REM cntrl codes out
30 POKE 65518,0 : REM PRDAT_typ=character
```

Printer Output Width

Output width to your Centronics printer defaults to 64 columns to logically match the screen; what you see on the screen is exactly what you get on your printer. This 64 column output is not centered on the paper, but most printers have control codes to set the left margin. Below is an example of how you would center the LLIST/LPRINT output for a Star Micronics SG10.

Example:

```
10 POKE 65518,1 : REM PRDAT_typ=cntrl code
20 LPRINT CHR$ 27;"M";CHR$ 8; : REM cntrl codes out
30 POKE 65518,0 : REM PRDAT_typ=character
```

Changing Printer Width

To change printer output width, do the following…

          < POKE 65525,width : RANDOMIZE USR 15623 >

Note: Maximum width is 255 characters.

Suppressing System Linefeed/Carriage Return

The system normally generates a Carriage return and a Linefeed code after
each 'width' no# of characters, but we can suppress this by doing the
following…

          < POKE 65510,0 : REM suppress linefeed>
          < POKE 65511,0 : REM suppress carriage return >

If you suppress carriage returns, you will become responsible for deciding
when you want a carriage return. You will have to explicitly send this code
when necessary. You could use the following routine to do this…

          10 POKE 65518,1
          20 LPRINT CHR$ 13;
          30 POKE 65518,0

Suppressing the system CR/LF will effect LLIST so you will have to be
careful to consider this during program development.

To restore normal CR/LF operation, POKE 65510,13 & POKE 65511,10.

Centering COPY Output

COPY output is normally aligned with the left-hand side of the printer
paper. OS-64 has a built-in facility to allow COPY centering if you should
desire it. Eight bytes in the extended system variables area are reserved as
a COPY centering control code table. The control codes necessary to set the
left-hand margin for printing are different from printer to printer. If you
can determine the control code sequence for your printer, you can POKE them
into the table , thereby centering all the subsequent COPY output, Below is
an example for the Star Micronics SG10 printer.

    10 POKE 65528,3: REM length of the subsequent cntrl code sequence
    20 POKE 65529,27: REM ESCAPE code
    30 POKE 65530,77: REM set left margin code
    40 POKE 65531,19: REM left margin at column 19

Please note that memory address 65528 holds the length of the subsequent
control code sequence. It is very important to have this correct.

Important Printer Notes

- Embedded print commas cause a linefeed.

- COPY routines reset all printer modes to power up defaults.

- At the end of LPRINT/LLIST output to your Centronics printer the printer's buffer may still have the last bit of LPRINT/LLIST data stored but unprinted. Executing < LPRINT > will force the remaining buffer to be printed.

- If you are outputting to your Centronics printer and it does goes offline (error, paper-out, power-off), oppressing BREAK will not immediately return you to BASIC. This is because, at BREAK time, the print-out routine does special output to clear the printer, and if the printer is offline it will wait until you service the printer and bring it back online, before terminating.

OS-64 Variances

The OS-64 in most respects is a fully functional equivalent to your normal system. The few areas where the OS-64 varies from your normal system will be discussed in the following sections.

Graphics

Under the OS-64 your screen display is actually 512 pixels wide but you cannot access this double horizontal from BASIC. The following graphics commands: PLOT, DRAW, CIRCLE, work exactly as they do in the normal system. You specify (X,Y) coordinates where X has the range of 0-255 and Y has a range of 0-175. The graphics will be drawn exactly as you would expect.

The graphics command POINT works a bit differently in OS-64 than with your normal system. Normally POINT tests the single screen pixel specified and returns the value zero if that pixel is off or the value one if that pixel is on. With the OS-64 you use the specification coordinates with the same range (X = 0-255) but two pixels are tested at once and the actual pixels tested (in the 512 wide screen) are ((X*2),Y) and (((X*2)+1),Y). The following values are returned by the POINT command and reflect the status of the two pixels tested…

```
0 = Both pixels off     > 00
1 = Right pixel on      > 01
2 = Left pixel on       > 10
3 = Both pixels on      > 11
```

Screen Saving

The normal method of SAVEing screens will not work for 64 column screens, To SAVE a 64 column screen you must SAVE two separate code blocks back-to-back as follows…

< SAVE "name" CODE 16384,6144: SAVE "name" CODE 24576,6144 >

To LOAD your saved screens back into memory, do the execute commands…

< LOAD "name" CODE 16384: LOAD "name" CODE 24576 >

Using OS-64 with ZEBRA Disk Drives

OS-64 is compatible with the ZEBRA disk drive with the following exceptions.

1. When you press the reset button on the disk drive interface module, the OS-64 will not boot up properly unless you ensure that there is

   a. No disk in drive 'A', or

   b. You have a 'START' program on the disk in drive 'A' with the following as its first line: < OUT 244,3: RANDOMIZE USR 3379 >, or

   c. For the OS-64 boot and auto-CAT on reset: < OUT 244,3: RANDOMZE USR 3379: CAT * >, or

   d. For the OS-64 to boot and auto-start a program on reset: < OUT 244,3: RANDOMIZE USR 3379: LOAD *"name" >.

2. Due to a lack of foresight on the TOS programmers' part, the Disk MERGE command will not work with OS-64 without special POKES directly preceding MERGE commands. The following technique should allow you to MERGE from disk: < POKE 26064,195: POKE 26065,144: POKE 26066,253: MERGE *"name" >.

Extended System Variables

Number Of Bytes	Address	Name	Contents
2	65506	-	Unused locations.
2	65508	Xpos	Used by COPY routine.
1	65510	CR	Code here is sent out by LPRINT and LLIST as carriage return.
1	65511	LF	Same as above but for linefeed.
2	65512	COPY_addr	Address of the Centronics COPY routine. Normally points to ROM, but, you can alter it to point to your own routine.
1	65514	-	Unused location.
1	65515	Hpos	Used by COPY routine.
1	65516	COLM	Used by COPY routine.
1	65517	MAXcl	Highest column in printer buffer with character in it.
1	65518	PRDAT_typ	Printer data type: 0 = character, 1 = control codes or graphic data.
1	65519	LINE	Used by COPY routine.
1	65520	Ypos	Used by COPY routine.
2	65521	-	Unused locations.
2	65523	IFDR_addr	Interface driver routine address. Normally points to ROM, but, you can alter it to point to your own routine.
1	65525	WDTH	Printer output width.
1	65526	-	Unused location.
1	65527	FLAGSnew	Various control flags.
8	65528	COPYtab	Table of control codes for COPY centering tabulation.

OS-64 Memory Map